

The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic visual effect.

Public vs. Private Construction Spending Analysis

Yuna Noh

Agenda

- ▶ Interesting patterns in the data
 - ▶ Clear difference in the amount of spending
 - ▶ Seasonality
- ▶ Reasons behind the patterns

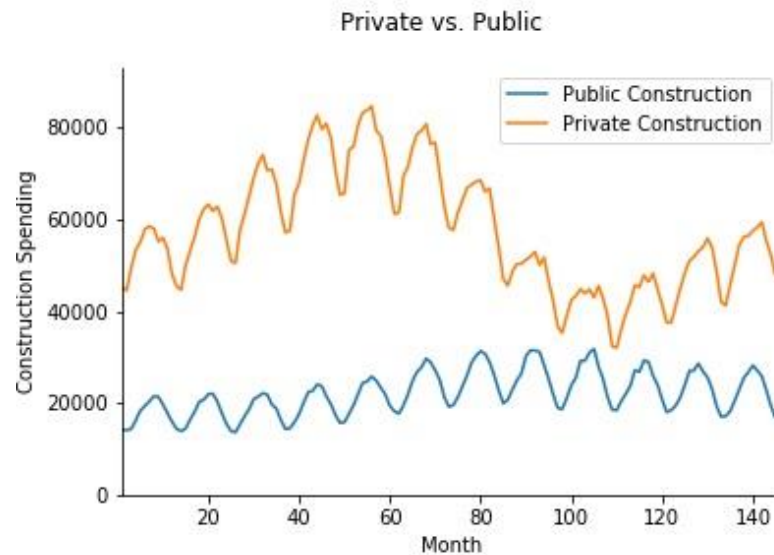
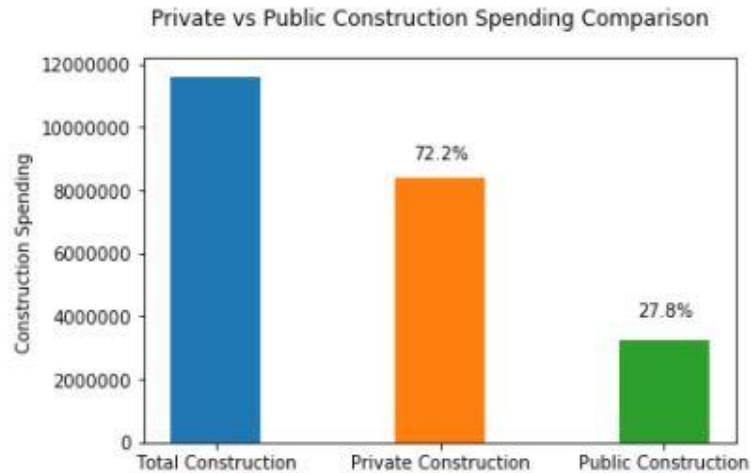
The Data

- ▶ ConstructionTimeSeriesDataV2.csv
- ▶ Recommendation
 - ▶ Collect March - December, 2014 data

Results

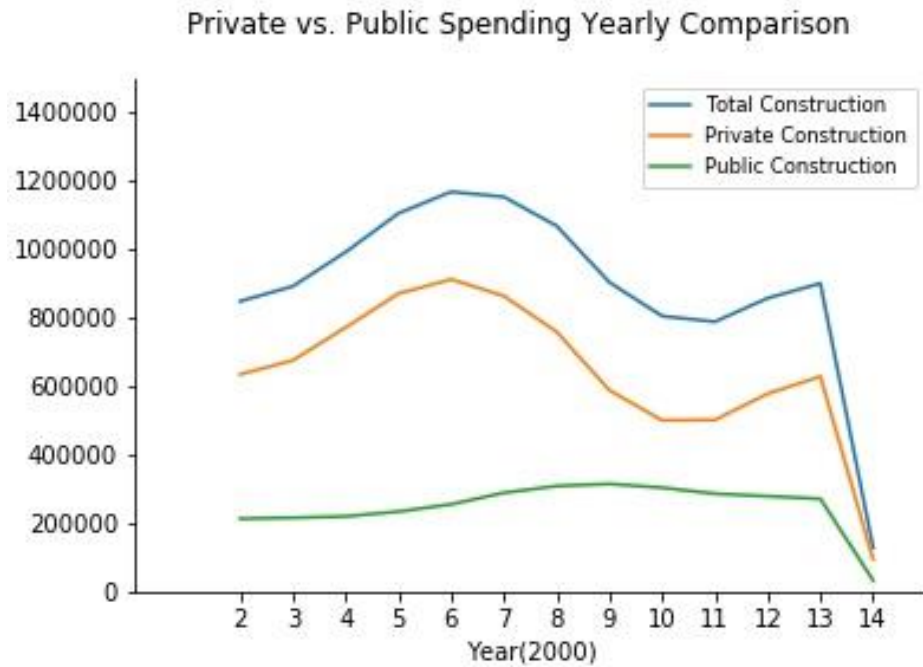
- ▶ Private spending is much higher than public spending
- ▶ Spending is higher during summer season
- ▶ Highest in 2006 and lowest in 2011

Total Spending Comparison



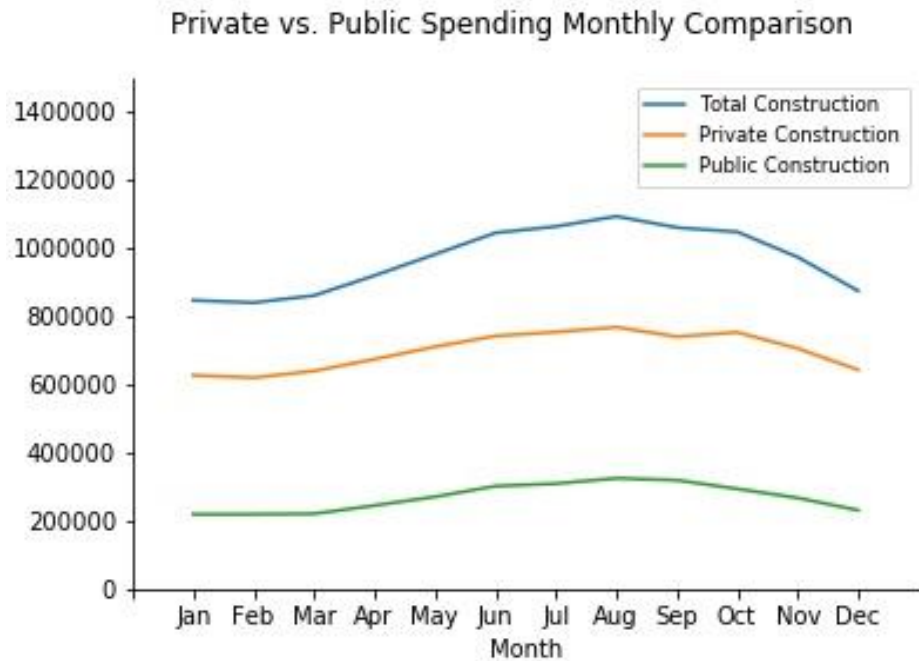
- ▶ 72.2% of total spending is private
- ▶ Low-bid, low-margin business
 - ▶ Complex regulations and laws
 - ▶ Low number of companies willing to take public jobs
 - ▶ Cannot invest too much on unprofitable business
- ▶ Seasonality found in both data

Yearly Comparison



- ▶ Private: Peaks and Valleys
 - ▶ Early 2006: Housing boom
 - ▶ 2007-08: Housing bubble burst
 - ▶ Late 2007-11: Great Recession
 - ▶ Subprime Mortgage Crisis
- ▶ Public: relatively steady
- ▶ 2014 lacks Mar - Dec data

Monthly Comparison



- ▶ Higher spending in summer
 - ▶ Summer construction season
 - ▶ Limited time to complete projects before winter
 - ▶ October in some regions
- ▶ Lower spending in winter
 - ▶ Jan, Feb 2014 data included

Conclusion

- ▶ Private Spending is much higher than Public Spending
 - ▶ Public construction: Low-bid, low-margin business
- ▶ Highest spending during housing boom (2006), and lowest during great recession (2007-2011)
- ▶ Higher spending in summer, lower spending in winter
- ▶ Complete 2014 data collection for further analysis

Back-up: Python Code

```
totalsum = sum(df['Total Construction'])
totalprivate = sum(df['Private Construction'])
totalpublic = sum(df['Public Construction'])
print "Sum of Total Construction:", totalsum
print "Total Private Construction:", totalprivate
print "Total Public Construction:", totalpublic

print "Percentage of Private Construction is ", (float(totalprivate)/float(totalsum))*100, "%"
print "Percentage of Public Construction is ", (float(totalpublic)/float(totalsum))*100, "%"
```

```
Sum of Total Construction: 11602718
Total Private Construction: 8376342
Total Public Construction: 3226390
Percentage of Private Construction is  72.1929292774 %
Percentage of Public Construction is  27.8071913839 %
```

Back-up: Python Code

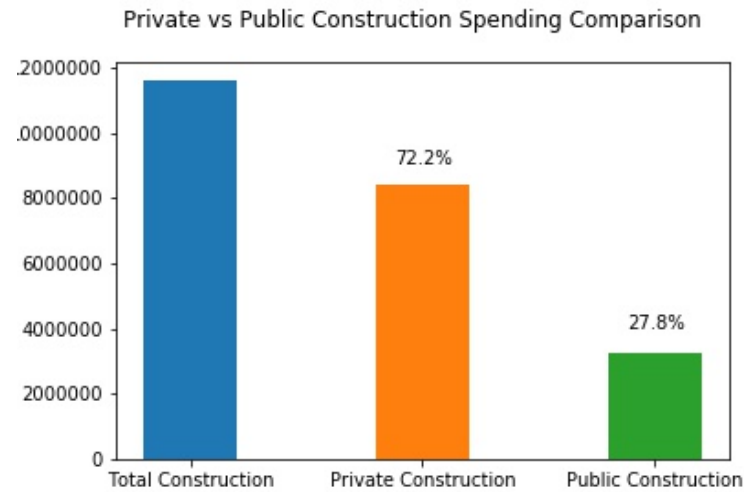
```
data = [totalsum, totalprivate, totalpublic]
objects = ['Total Construction', 'Private Construction', 'Public Construction']

fig, ax = plt.subplots()
total = ax.bar(1, totalsum, 0.4)
private = ax.bar(2, totalprivate, 0.4)
public = ax.bar(3, totalpublic, 0.4)

ax.set_xticklabels(objects)
ax.set_xticks([1.0, 2.0, 3.0])
ax.get_yaxis().get_major_formatter().set_scientific(False)
ax.yaxis.set_label_text('Construction Spending')

fig.suptitle('Private vs Public Construction Spending Comparison')
ax.text(1.88, 9000000, "72.2%")
ax.text(2.88, 4000000, "27.8%")

plt.savefig('percentage comparison.jpg')
```



Back-up: Python Code

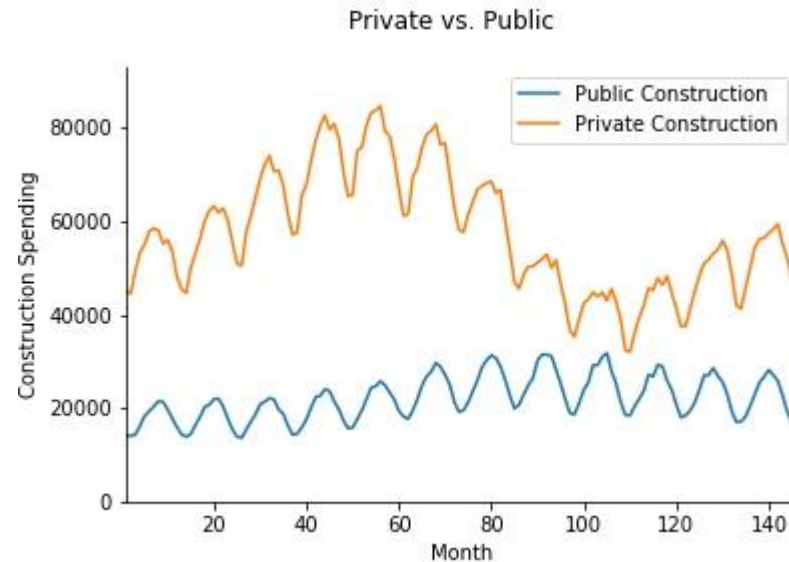
```
x = df.Month
y = df['Public Construction']
y1 = df['Private Construction']

fig, ax = plt.subplots()

ax.plot(x,y,label='Public Construction')
ax.plot(x,y1,label='Private Construction')
ax.xaxis.set_label_text('Month')
ax.yaxis.set_label_text('Construction Spending')
ax.axis([x.min(),x.max(),0,1.1*y1.max()])

ax.spines['right'].set_visible(False)
ax.spines['top'].set_visible(False)
plt.legend()

fig.suptitle('Private vs. Public')
plt.savefig('public private seasonal.jpg')
```



Back-up: Python Code

```
total_year=[]
private_year=[]
public_year=[]

for i in range(0,len(df['Total Construction']),12):
    total_year.append(sum(df['Total Construction'][i:i+12:]))

for j in range(0,len(df['Private Construction']),12):
    private_year.append(sum(df['Private Construction'][j:j+12:]))

for k in range(0,len(df['Public Construction']),12):
    public_year.append(sum(df['Public Construction'][k:k+12:]))

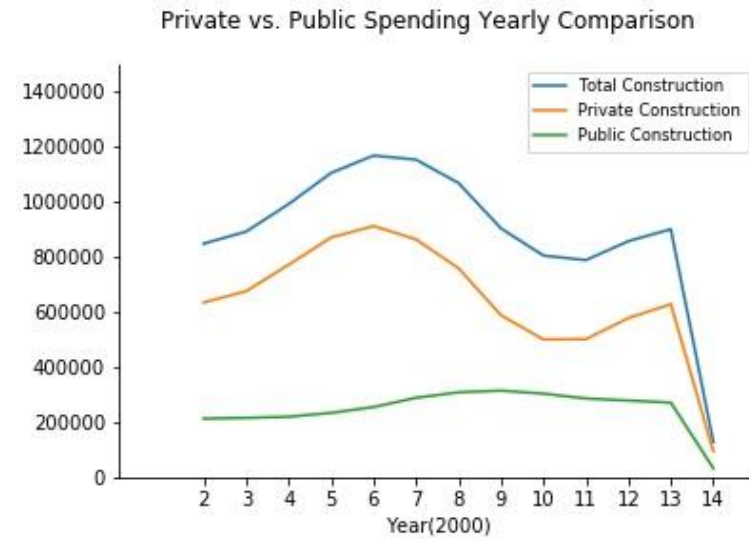
fig, ax = plt.subplots()
x = [2,3,4,5,6,7,8,9,10,11,12,13,14]
y = total_year
y1 = private_year
y2 = public_year

ax.plot(x,y,label='Total Construction')
ax.plot(x,y1,label='Private Construction')
ax.plot(x,y2,label='Public Construction')
ax.spines['right'].set_visible(False)
ax.spines['top'].set_visible(False)
ax.legend(loc = 'upper right', prop = {'size':'small'})
ax.set_xlim(0,15)
ax.set_ylim(0,1500000)

ax.xaxis.set_label_text('Year(2000)')
ax.xaxis.set_ticks(range(2,15))
ax.xaxis.set_ticklabels(x)
ax.xaxis.set_tick_params(which = 'both', top = 'off', bottom = 'on', labelleft = 'on')

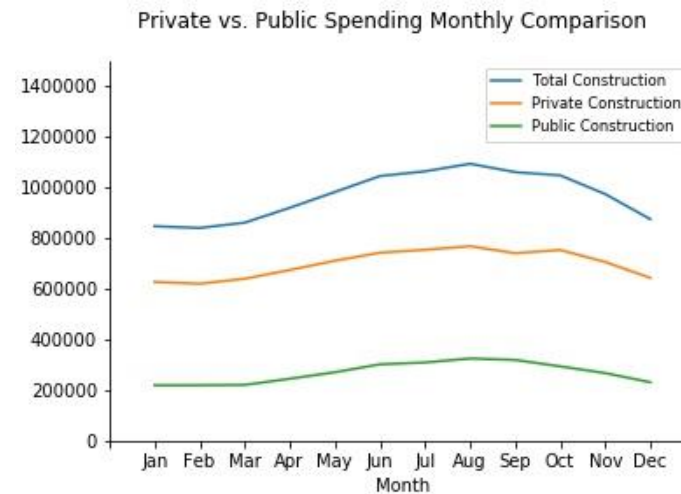
ax.yaxis.set_label_text('Construction Spending')
ax.yaxis.set_tick_params(which = 'both', right = 'off', left = 'on', labelleft = 'on')

fig.suptitle("Private vs. Public Spending Yearly Comparison")
plt.savefig('yearly comparison.jpg')
```



Back-up: Python Code

```
1 total_month = []
2 private_month = []
3 public_month = []
4
5 for i in range(12):
6     total_month.append(sum(df['Total Construction'][i::12]))
7 for j in range(12):
8     private_month.append(sum(df['Private Construction'][j::12]))
9 for k in range(12):
10    public_month.append(sum(df['Public Construction'][k::12]))
11
12 fig, ax = plt.subplots()
13 x = [1,2,3,4,5,6,7,8,9,10,11,12]
14 x_labels = ['', 'Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun', 'Jul', 'Aug', 'Sep', 'Oct', 'Nov', 'Dec']
15 y = total_month
16 y1 = private_month
17 y2 = public_month
18
19 ax.plot(x,y,label='Total Construction')
20 ax.plot(x,y1,label='Private Construction')
21 ax.plot(x,y2,label='Public Construction')
22 ax.spines['right'].set_visible(False)
23 ax.spines['top'].set_visible(False)
24 ax.legend(loc = 'upper right', prop = {'size':'small'})
25 ax.set_xlim(0,13)
26 ax.set_ylim(0,1500000)
27
28 ax.xaxis.set_label_text('Month')
29 ax.xaxis.set_ticks(range(0,13))
30 ax.xaxis.set_ticklabels(x_labels)
31 ax.xaxis.set_tick_params(which = 'both', top = 'off', bottom = 'on', labelleft = 'on')
32
33 ax.yaxis.set_label_text('Construction Spending')
34 ax.yaxis.set_tick_params(which = 'both', right = 'off', left = 'on', labelleft = 'on')
35
36 fig.suptitle("Private vs. Public Spending Monthly Comparison")
37 plt.savefig('monthly comparison.jpg')
```



Back-up: Yearly and Monthly summation result

	Total	Private	Public
2002	847877	634439	213438
2003	891498	675375	216127
2004	991357	771175	220184
2005	1104136	869978	234160
2006	1167222	911837	255387
2007	1152353	863278	289074
2008	1067565	758826	308738
2009	903201	588308	314895
2010	804562	500596	303968
2011	788015	501609	286407
2012	801284	540319	260964
2013	899948	628517	271434
2014	128029	94474	33555

	Total	Private	Public
Jan	846574	626974	219601
feb	839785	620040	219746
Mar	860630	639556	221073
Apr	919244	673895	245350
May	981457	710557	270903
Jun	1044379	742262	302118
Jul	1063172	753639	309535
Aug	1092866	767761	325107
Sep	1059830	740285	319546
Oct	1047159	752928	294235
Nov	973204	705589	267617
Dec	874418	642856	231559

Sources

- ▶ <http://www.equipmentworld.com/business-matters-government-vs-private-sector-contracting/>
- ▶ <https://www.cbpp.org/research/state-budget-and-tax/its-time-for-states-to-invest-in-infrastructure>
- ▶ <https://www.arvigbusiness.com/5-things-to-know-about-construction-season/>
- ▶ https://en.wikipedia.org/wiki/United_States_housing_bubble
- ▶ https://en.wikipedia.org/wiki/Great_Recession